INDUSTRY GROWTH

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Farm Credit East and Cornell PRO-DAIRY collaborate on project to illustrate potential financial impact of meeting environmental regulations

Thinking about the future: is compliance a barrier to growth?

Farm Credit East and Cornell PRO-DAIRY Program worked together to look at the financial impact on expanding a dairy farm with and without some typical environmental/regulatory costs; the results show that demonstrates cost of meeting environmental regulations a potential "significant financial shock" when expanding a farm to CAFO-size unless significant cost-share funds are available. ".

As a typical Northeast farm family considers their future, they often contemplate an expansion to allow for a son or daughter to return to the farm. The threshold of 200 mature dairy cows is the farm size where a CAFO Permit is required in New York. CAFO rules increase demands on management and capital at a point in a dairy business when resources are often already stretched to the limit. The additional costs associated with CAFO possibly delay an expansion or force consideration of a different approach. While any one farm has several potential routes to increase milk production, the CAFO "glass ceiling" is a barrier that must be addressed, while also meeting public policy goals of environmental protection.

The Farm Credit East Knowledge Exchange program and Cornell PRO-DAIRY modeled a farm that is expanded to make room for the next generation, with and without, CAFO- related compliance costs. This analysis provides insights into the financial implications of expansion of a hypothetical average dairy farm from 190 cows to 290 cows. The analysis is based on actual data for a six-year period from the Farm Credit Northeast Dairy Farm Summary (DFS). Environmental compliance costs are estimated by Cornell PRO-DAIRY and based on conversations with planners and engineers that operate in NY and surrounding states.

Overall, this analysis is not exhaustive: some modest income and expense items are not included and other details could be debated. To do so misses the point: at 200 cows, for states where medium CAFO regulations kick in, they do so at a critical pinch point in the life cycle of a small rural enterprise. Farmers in the 200 cow size range tend to have the challenges of both smaller and larger farms at the same time, but without economies of scale. Most of these farmers must grow the farm incrementally from a capital and managerial resource perspective. While environmental protection is a worthy public policy goal, how this goal is achieved could be better aligned with reality on the ground. Careful alignment of the two goals will help improve the sustainability of dairy farms in the eastern US for many years to come.

The Model

A major challenge to project any kind of financial results for a dairy farm is milk price and input volatility. For example, 2011 was a rather good year for Northeast dairy, well above average. Already, 2012 is shaping up to be much worse. Clearly, projecting forward using 2011 numbers will produce unrealistic results. Looking in the rear-view mirror, 2010 was a good year, yet 2009 was one of the worst years ever. To bridge these tremendous ups and downs for a realistic measure of performance, a six-year average was used, 2006 to 2011, to capture two dairy price cycles. This six-year average was used for all variables, from milk price and other revenues to expenses, for consistency. Note that the use of the six-year average milk price, while realistic over time, does not reflect the true financial impact of our project during a low price period.

0To keep the model simple, and introduce as few extraneous influences as possible, it was assumed that the next six years will be similar to the past six years. Given that dairy fortunes seem to wax and wane in a somewhat predictable 3-year cycle, this seemed reasonable. No adjustment was made

FYI

- The full study report is available online at: **https://www.farmcrediteast.com/en/News-and-Events/News/20120618CAFOstudy.aspx.**

for inflation. From a modeling perspective, inflation should impact revenues and expenses more or less equally. Appropriate adjustments were made to the income statement and balance sheet reflecting the impact of the 100 cow expansion. Notes were made explaining each adjustment made. Other line items not involved in the expansion were assumed unchanged.

No changes in revenues or expenses other than the impact of the herd expansion were assumed. It was also assumed that the expansion farm would not need a new milking parlor in an effort to limit costs and external factors. This farmer took on no new debt, and made no new capital expenditures, other than those related to the expansion. The, with and without, CAFO scenarios are identical, except for the specific expenses related to CAFO compliance. The financial position of the farmer under both scenarios was projected forward six years. Debt service was assumed to be over a blended 10-year term seeking to account for the various amortization periods typical for cows and real estate improvements. Debt service was calculated assuming a 5% interest rate which, while reasonable for the past six years, remains well below historical average. When rates return to historical levels, the added interest expense will have a significant impact on results.

In preparing this analysis, it is understood that many variables could be adjusted. Wherever possible, the number of variables were limited to simplify the approach taken. For example, income and expenses were adjusted in proportion to size increase.

The farmer incurs additional debt for the expansion of the barn ($180,000) and the addition of cows ($202,500). It was assumed that the current milking parlor is adequate for 290 cows and that the farm owner will rent more farmland rather than incur additional debt for the purchase of land. These assumptions will not work in all cases, but this is a typical example – a farmer makes incremental adjustments in size to a more viable economic unit. In this typical situation, a farmer takes on more debt to expand and works hard to pay down that debt. As shown in this example, the farmer's percent of net worth drops considerably with the expansion – the farm operator builds back that net worth and positions the farm for the next incremental change.

The Results

The CAFO related costs include the following (CNMP expensed, all other costs financed):

Cost of Comprehensive Nutrient Management Plan (year 1):	$15,000
Annual update of CNMP:	$ 5,000
Cost of engineering designs (split year 1 and 2):	$25,000

Farm undertakes projects for manure storage, milking center, one barnyard, low flow/high flow control for bunk. Assumes six months storage (about 1.5 million gallons), earthen, no sand bedding, push-off ramp to fill.

Manure storage	$50,000
Manure pump to empty storage and truck	$15,000
Cover for heifer barnyard	$30,000
Low flow collection/bunk modification	$15,000
High flow collection	$ 5,000
Milking center waste (pipe to manure pit)	$ 2,000

Some farmers may be able to avoid a manure storage facility. Just as likely, a farmer may have additional costs beyond what is estimated here, depending on that farm's specific situation. We also note that farmers are planning both for the long-term and short-term in an expansion – this farmer may ultimately move to 400 cows at some point in the future and thus they have to build the necessary foundation for the next step. It is assumed that the farm operator is willing and able to assume the management responsibilities for CAFO compliance, which may be considerable and pull the operator away from other management responsibilities. No additional costs associated with the additional management time necessary to plan and implement CAFO were estimated. Also, the nutrient management plan was not credited with any reduced expenses or increased yields, though some farmers could realize both. The hypothetical farmer did not receive any grants to assist with the additional CAFO expenses.

Summary of Findings – Financial Implications-190 to 290

Pre-Expansion	**2011**
Cow Numbers	190
Value of agricultural production	$853,068
Adjusted farm expenses	$720,322
Net farm income1	$124,957
Net earnings[2]	$ 38,380
Cash Margin[3]	$ 35,991
Total debt	$560,753
Debt per cow	$ 2,951
Percent net worth	75%

[1]Net farm income is value of farm production less adjusted cash operating expenses. It does not include depreciation.

[2]Net earnings is net farm income, after depreciation, plus nonfarm income, less family living and income taxes.

[3]Cash margin is the amount of cash available, after operations, and after making loan principal payments.

Expanded operation - no special CAFO investment/expense	**2012**	**2014**
Cow Numbers	290	290
Value of agricultural production	$1,243,408	$1,243,408
Adjusted farm expenses	$1,199,945	$1,180,525
Net farm income	$ 129,392	$ 148,812
Net Earnings	$ 8,501	$ 27,921
Cash Margin	$ 18,465	$ 34,156
Total debt	$ 939,981	$ 868,961
Debt per cow	$ 3,241	$ 2,996
Percent net worth	64%	68%

Expanded operation - with CAFO investment/expense	**2012**	**2014**
Cow Numbers	290	290
Value of agricultural production	$1,243,408	$1,243,408
Adjusted farm expenses	$1,220,807	$1,190,850
Net farm income	$ 108,530	$ 138,487
Net earnings	($ 12,361)	$ 17,596
Cash Margin	($ 13,395)	$ 12,296
Total debt	$1,072,206	$ 977,815
Debt per cow	$ 3,697	$ 3,372
Percent net worth	59%	64%

The Conclusion

Expansion from 190 to 290 cows causes a significant shock to the finances of the hypothetical farm. Top line revenue grows from $845,278 in 2011 to $1,235,618 in 2012 and subsequent years. However, expenses grow as well. Most expenses increase proportionally to the expansion. The farm without the NY CAFO expense adds an additional $382,500 in intermediate- and long-term debt. This reduces net worth from 75% to 64% and brings ROA down from 1.7% to 0.5%. Except for year 2, when the farm has a small deficit, however, our farm remains cash positive.

The farmer who complies with NY CAFO regulations has a much greater financial challenge. Top line revenue grows the same as the non-CAFO farm, but expense of $5,000 annually is added for CNMP updates that must be absorbed. Additionally, the farmer must take on $524,500 in new debt to finance both the herd expansion and the CAFO compliance. Net worth declines from 75% to 59%, and ROA becomes negative (0.3%). Cash margin drops from $35,991, before expansion, to ($13,395). With the manure storage eliminated, the farmer would see slightly positive cash margins, making this project possible but risky in a volatile economic environment.

One key factor is that this hypothetical farm, as with most dairy farms in the Northeast, already has substantial debt. Without the debt service from its existing debt, the case farmer's expansion looks a lot better. However, only a minority of dairy farmers in the region have little to no debt. With the debt load of an average farm, the future cash flow is insufficient to cover the additional debt service of the CAFO-compliant expansion. Note also that the Dairy Farm Summary used 'average' farm data. Half of the farmers will fare worse than this example indicates.

Not specifically addressed in this study is the opportunity cost of the CAFO expense. The additional debt and cost of CAFO compliance could keep the study farmer from being able to make land purchases, upgrade equipment to keep up with the needs of a larger herd, maintain cash reserves for an inevitable down year, and forego other potential opportunities or risk management strategies. Further, the use of a six-year average milk price blurs the impact that a low milk price cycle could have. Even without CAFO compliance costs, a stretch of low milk prices would put our study farmer in serious financial jeopardy.

Finally, compliance requires management time and expertise. Many farm owners are unable or unwilling to expand due to the large management needs of maintaining compliance with current CAFO regulations. The farm owner must either do the work themselves, at a size at which they are likely to still have significant operational responsibility, or outsource / hire additional staff to cover it, at an additional expense. In this study, such an expense was not budgeted for. ❐

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was built in 2008. With the drop in milk prices, concrete was never poured, a milk house wasn't built, and individual pens weren't constructed. This set them up well for the conversion to group housing, and at this point no more changes are planned for the barn, Lynn said. Calves are bedded with shavings and straw, which they like to nestle in during the winter. Air quality and drainage are good.

"Sarah just plain doesn't lose any calves," Lynn said. "Because of the changes we are able to make the growth internally." Internal herd growth is now 13 percent, up from 4 percent before the calves were group-housed.

With the new construction calving pens will be moved into the new barns where the people are.

"Our loss is at night, so we need to put them in a location where the people are," Lynn said.

The new barn will have same head-to-head four rows, with 16 ft curb to curb stalls, layout as was built in the first phase of expansion. Other keys to success include lots of fans and water sprinklers on headlocks. The parlor is a basement design that is expandable. The first 2/3 currently has equipment.

The Murrays traveled to Midwest dairies in Indiana, Wisconsin and Michigan to view what worked on other farms. "We took the best we could find," Lynn said. "We're real happy with it. We think we can make more milk in a four row barn with the feed space. Cows like to be together."

The first phase of expansion probably would have happened quicker, except for low milk prices in 2009, which set the Murrays back.

"We didn't make the progress we had planned, and it took us another year or two," Lynn said. "Everyone in the banking and service industry, including us, prior to that were more willing to take risk."

Protocols were written and put in place before the expansion. "We wanted to make sure everyone was doing as good as we could do before we made the jump."

The future looks bright for making milk in NY because of ample manufacturing capacity, Lynn said. And, he credits the farm's employees, as key to their success.

"Our mission is to create a reasonable living for our valued employees and their families, and hope growth will do that," he said. "Our employees are proud of what they do. We wouldn't be doing an expansion if we weren't so fortunate to have good people doing a fantastic job." ❐